Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.   (Canceled)

2.   (Currently Amended) A method for managing Internet Protocol (IP) addresses on a data communications network, comprising:

allocating a plurality of local IP address pools, each of said local IP address pools

associated with a different network edge device capable of accepting

connection requests requiring an IP address, said network edge device

having a local memory, said local memory including a local IP address

pool database;

requesting IP address usage data from one or more of said network edge devices;

receiving said requested IP address usage data;

determining whether one or more of said plurality of local IP address pools should

be reallocated based upon at least said requested IP address usage data;

reallocating one or more of said plurality of local IP address pools based upon

said determining; and

updating one or more of said local IP address pool databases and a global IP pool

database based upon said reallocating, said global IP address pool

database including the information maintained in each said local IP address

pool;

~~The method of claim 1~~ wherein

> said local IP address pool includes a high watermark that indicates <u>a measurement</u> <u>of</u> the maximum number of IP addresses used by said network edge device;
>
> said determining further comprises ascertaining whether said high watermark of a local address pool exceeds a high watermark limit; and
>
> said method further comprises indicating one or more IP address pools should be reallocated to give more IP addresses to the network element associated with said high watermark when said high watermark exceeds said high watermark limit.

3.   (Original)   The method of claim 2 wherein

each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said low watermark of said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated with said low watermark when said low watermark exceeds said low watermark limit.

4.   (Original)   The method of claim 3 wherein said reallocating further comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools

when said high watermark exceeds said high watermark limit and when

the number of unallocated IP addresses is insufficient;

allocating an IP addresses from unallocated IP addresses when said high

watermark exceeds said high watermark limit and when the number of

unallocated IP addresses is sufficient; and

reallocating one or more IP address pools to reclaim IP addresses from a local IP

address pool when said high watermark is less than said high watermark

limit and said low watermark is greater than said low watermark limit.

5.   (Currently Amended) The method of claim ~~1~~ 2 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said low

watermark of said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be

reallocated to reclaim IP addresses from the network element associated

with said low watermark when said low watermark exceeds said low

watermark limit.

6.   (Original)   The method of claim 3 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

7.   (Original)   The method of claim 6 wherein said network operates according to a simple network management protocol (SNMP).

8.   (Original)   The method of claim 7 wherein

said low watermark is stored in an expression MIB; and

said high watermark is stored in an expression MIB.

9-25.   (Canceled)

26.   (Original)   A method for managing Internet Protocol (IP) addresses on a data communications network, comprising:

allocating a plurality of local IP address pools, each of said local IP address pools associated with a different network edge device capable of accepting connection requests requiring an IP address, said network edge device having a local memory, said local memory including a local IP address pool database;

requesting IP address usage data from one or more of said network edge devices;

receiving said requested IP address usage data;

determining whether one or more of said plurality of local IP address pools should be reallocated based upon at least said requested IP address usage data;

reallocating one or more of said plurality of local IP address pools based upon said determining; and

updating one or more of said local IP address pool databases and a global IP pool database based upon said reallocating, said global IP address pool database including the information maintained in each said local IP address pool;

~~The program storage device of claim 25~~ wherein

said local IP address pool includes a high watermark that indicates a measurement of the maximum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said high watermark of a local address pool exceeds a high watermark limit; and

said method further comprises indicating one or more IP address pools should be reallocated to give more IP addresses to the network element associated with said high watermark when said high watermark exceeds said high watermark limit.

27. (Original)   The program storage device of claim 26 wherein

each said local IP address pool further comprises a low watermark that indicates the minimum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said low watermark of said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be reallocated to reclaim IP addresses from the network element associated

with said low watermark when said low watermark exceeds said low

watermark limit.

28.   (Original)   The program storage device of claim 27 wherein said reallocating

further comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools

when said high watermark exceeds said high watermark limit and when

the number of unallocated IP addresses is insufficient;

allocating an IP addresses from unallocated IP addresses when said high

watermark exceeds said high watermark limit and when the number of

unallocated IP addresses is sufficient; and

reallocating one or more IP address pools to reclaim IP addresses from a local IP

address pool when said high watermark is less than said high watermark

limit and said low watermark is greater than said low watermark limit.

29.   (Currently Amended) The program storage device of claim 25 26 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said low watermark of

said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be

reallocated to reclaim IP addresses from the network element associated

with said low watermark when said low watermark exceeds said low

watermark limit.

30.   (Original)   The program storage device of claim 27 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

31.   (Original)   The program storage device of claim 30 wherein said network

operates according to a simple network management protocol (SNMP).

32.   (Original)   The program storage device of claim 31 wherein

said low watermark is stored in an expression MIB; and

said high watermark is stored in an expression MIB.

33-49. (Canceled)

50.   (Currently Amended) An apparatus for managing Internet Protocol (IP) addresses

on a data communications network, the apparatus comprising:

means for allocating a plurality of local IP address pools, each of said local IP

address pools associated with a different network edge device capable of

accepting connection requests requiring an IP address, said network edge

device having a local memory, said local memory including a local IP

address pool database;

means for requesting IP address usage data from one or more of said network

edge devices;

means for receiving said requested IP address usage data;

means for determining whether one or more of said plurality of local IP address

pools should be reallocated based upon at least said requested IP address

usage data;

means for reallocating one or more of said plurality of local IP address pools

based upon said determining; and

means for updating one or more of said local IP address pool databases and a

global IP pool database based upon said reallocating, said global IP

address pool database including the information maintained in each said

local IP address pool;

~~The apparatus of claim 49~~ wherein

said local IP address pool includes a high watermark that indicates a measurement

of the maximum number of IP addresses used by said network edge

device;

said means for determining further comprises means for ascertaining whether said

high watermark of a local address pool exceeds a high watermark limit;

and

said apparatus further comprises means for indicating one or more IP address

pools should be reallocated to give more IP addresses to the network

element associated with said high watermark when said high watermark

exceeds said high watermark limit.

51. (Original)   The apparatus of claim 50 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said means for determining further comprises means for ascertaining whether said

low watermark of said address pool exceeds a low watermark limit; and

said apparatus further comprises means for indicating one or more IP address

pools should be reallocated to reclaim IP addresses from the network

element associated with said low watermark when said low watermark

exceeds said low watermark limit.

52. (Original)   The apparatus of claim 51 wherein said reallocating further

comprises:

means for allocating an IP address from IP addresses reclaimed from other IP

address pools when said high watermark exceeds said high watermark

limit and when the number of unallocated IP addresses is insufficient;

means for allocating an IP addresses from unallocated IP addresses when said

high watermark exceeds said high watermark limit and when the number

of unallocated IP addresses is sufficient; and

means for reallocating one or more IP address pools to reclaim IP addresses from

a local IP address pool when said high watermark is less than said high

watermark limit and said low watermark is greater than said low

watermark limit.

53.   (Currently Amended) The apparatus of claim 50 49 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said means for determining further comprises ascertaining whether said low

watermark of said address pool exceeds a low watermark limit; and

said apparatus further comprises means for indicating one or more IP address

pools should be reallocated to reclaim IP addresses from the network

element associated with said low watermark when said low watermark

exceeds said low watermark limit.

54.   (Original)   The apparatus of claim 51 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

55.   (Original)   The apparatus of claim 54 wherein said network operates

according to a simple network management protocol (SNMP).

56.   (Original)   The apparatus of claim 55 wherein

said low watermark is stored in an expression MIB; and

said high watermark is stored in an expression MIB.

57-73. (Canceled)

74.   (Original)   An apparatus capable of managing Internet Protocol (IP) addresses

on a data communications network, said apparatus comprising:

a memory for storing a global IP address pool; and

a global IP pool manager, comprising:

an allocator capable of allocating a plurality of local IP address pools, each of said

local IP address pools associated with a different network edge device

capable of accepting connection requests requiring an IP address;

a requestor capable of requesting IP address usage data from one or more of said

network edge devices;

a determiner capable of determining whether one or more of said plurality of local

IP address pools should be reallocated based upon at least said requested

IP address usage data;

a reallocator capable of reallocating one or more of said plurality of local IP

address pools based upon said an indication from said determiner; and

an updater capable of updating one or more of said local IP address pool

databases and said global IP pool database based upon said reallocating;

~~The apparatus of claim 73~~ wherein

said local IP address pool includes a high watermark that indicates a measurement

of the maximum number of IP addresses used by said network edge

device; and

said determiner is further configured to ascertain whether said high watermark of

a local address pool exceeds a high watermark limit and to indicate IP

address pool should be reallocated to give more IP addresses to the

network element associated with said high watermark when said high

watermark exceeds said high watermark limit.

75. (Original) The apparatus of claim 74 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

and

said determiner is further configured to ascertain whether said low watermark of

said address pool exceeds a low watermark limit and to indicate one or

more IP address pools should be reallocated to reclaim IP addresses from

the network element associated with said low watermark when said low

watermark exceeds said low watermark limit.

76. (Original) The apparatus of claim 75 wherein said reallocator further

configured to:

allocate an IP address from IP addresses reclaimed from other IP address pools

when said high watermark exceeds said high watermark limit and when

the number of unallocated IP addresses is insufficient;

allocate an IP addresses from unallocated IP addresses when said high watermark

exceeds said high watermark limit and when the number of unallocated IP

addresses is sufficient; and

reallocate one or more IP address pools to reclaim IP addresses from a local IP

address pool when said high watermark is less than said high watermark

limit and said low watermark is greater than said low watermark limit.

77.   (Currently Amended) The apparatus of claim 74 73 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

and

said determiner is further configured to ascertain whether said low watermark of

said address pool exceeds a low watermark limit and to indicate one or

more IP address pools should be reallocated to reclaim IP addresses from

the network element associated with said low watermark when said low

watermark exceeds said low watermark limit.

78.   (Original)   The apparatus of claim 75 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

79.   (Original)   The apparatus of claim 78 wherein said network operates

according to a simple network management protocol (SNMP).

80.   (Original)   The apparatus of claim 79 wherein

said low watermark is stored in an expression MIB; and

said high watermark is stored in an expression MIB.

81-96. (Canceled)

97.   (Previously Presented) A method for managing Internet Protocol (IP) addresses on a data communications network, comprising:

allocating a plurality of local IP address pools, each of said local IP address pools

associated with a different network edge device capable of accepting

connection requests requiring an IP address, said network edge device

having a local memory, said local memory including a local IP address

pool database;

requesting IP address usage data from one or more of said network edge devices;

receiving said requested IP address usage data;

determining whether one or more of said plurality of local IP address pools should

be reallocated based upon at least said requested IP address usage data;

reallocating one or more of said plurality of local IP address pools based upon

said determining;

updating one or more of said local IP address pool databases and a global IP pool

database based upon said reallocating, said global IP address pool

database including the information maintained in each said local IP

address pool;

wherein said local IP address pool includes a high watermark that indicates the

maximum number of IP addresses used by said network edge device;

wherein said determining further comprises ascertaining whether said high

watermark of a local address pool exceeds a high watermark limit;

indicating one or more IP address pools should be reallocated to give more IP

addresses to the network element associated with said high watermark

when said high watermark exceeds said high watermark limit;

wherein each said local IP address pool further comprises a low watermark that

indicates the minimum number of IP addresses used by said network edge

device;

wherein said determining further comprises ascertaining whether said low

watermark of said address pool exceeds a low watermark limit; and

indicating one or more IP address pools should be reallocated to reclaim IP

addresses from the network element associated with said low watermark

when said low watermark exceeds said low watermark limit.

98.   (Previously Presented) The method of claim 97 wherein said reallocating further
comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools

when said high watermark exceeds said high watermark limit and when

the number of unallocated IP addresses is insufficient;

allocating an IP addresses from unallocated IP addresses when said high

watermark exceeds said high watermark limit and when the number of

unallocated IP addresses is sufficient; and

reallocating one or more IP address pools to reclaim IP addresses from a local IP

address pool when said high watermark is less than said high watermark

limit and said low watermark is greater than said low watermark limit.

99. (Previously Presented) The method of claim 97 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said low

watermark of said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be

reallocated to reclaim IP addresses from the network element associated

with said low watermark when said low watermark exceeds said low

watermark limit.

100. (Previously Presented) The method of claim 97 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

101. (Previously Presented) The method of claim 97 wherein said network operates

according to a simple network management protocol (SNMP).

102.	(Previously Presented) The method of claim 101 wherein

said low watermark is stored in an expression MIB; and

said high watermark is stored in an expression MIB.

103.	(Previously Presented) A program storage device readable by a machine,

embodying a program of instructions executable by the machine to perform a method to

manage Internet Protocol (IP) addresses on a data communications network, the method

comprising:

allocating a plurality of local IP address pools, each of said local IP address pools

associated with a different network edge device capable of accepting

connection requests requiring an IP address, said network edge device

having a local memory, said local memory including a local IP address

pool database;

requesting IP address usage data from one or more of said network edge devices;

receiving said requested IP address usage data;

determining whether one or more of said plurality of local IP address pools should

be reallocated based upon at least said requested IP address usage data;

reallocating one or more of said plurality of local IP address pools based upon

said determining;

updating one or more of said local IP address pool databases and a global IP pool

database based upon said reallocating, said global IP address pool

database including the information maintained in each said local IP

address pool;

wherein said local IP address pool includes a high watermark that indicates the

maximum number of IP addresses used by said network edge device;

wherein said determining further comprises ascertaining whether said high

watermark of a local address pool exceeds a high watermark limit;

indicating one or more IP address pools should be reallocated to give more IP

addresses to the network element associated with said high watermark

when said high watermark exceeds said high watermark limit;

wherein each said local IP address pool further comprises a low watermark that

indicates the minimum number of IP addresses used by said network edge

device;

wherein said determining further comprises ascertaining whether said low

watermark of said address pool exceeds a low watermark limit; and

indicating one or more IP address pools should be reallocated to reclaim IP

addresses from the network element associated with said low watermark

when said low watermark exceeds said low watermark limit.

104. (Previously Presented) The program storage device of claim 103 wherein said

reallocating further comprises:

allocating an IP address from IP addresses reclaimed from other IP address pools

when said high watermark exceeds said high watermark limit and when

the number of unallocated IP addresses is insufficient;

allocating an IP addresses from unallocated IP addresses when said high

watermark exceeds said high watermark limit and when the number of

unallocated IP addresses is sufficient; and

reallocating one or more IP address pools to reclaim IP addresses from a local IP

address pool when said high watermark is less than said high watermark

limit and said low watermark is greater than said low watermark limit.

105.   (Previously Presented) The program storage device of claim 103 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said determining further comprises ascertaining whether said low

watermark of said address pool exceeds a low watermark limit; and

said method further comprises indicating one or more IP address pools should be

reallocated to reclaim IP addresses from the network element associated

with said low watermark when said low watermark exceeds said low

watermark limit.

106.   (Previously Presented) The program storage device of claim 103 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

107.   (Previously Presented) The program storage device of claim 103 wherein said

network operates according to a simple network management protocol (SNMP).

108.   (Previously Presented) The program storage device of claim 107 wherein

said low watermark is stored in an expression MIB; and

said high watermark is stored in an expression MIB.

109.   (Previously Presented) An apparatus for managing Internet Protocol (IP)

addresses on a data communications network, comprising:

means for allocating a plurality of local IP address pools, each of said local IP

address pools associated with a different network edge device capable of

accepting connection requests requiring an IP address, said network edge

device having a local memory, said local memory including a local IP

address pool database;

means for requesting IP address usage data from one or more of said network

edge devices;

means for receiving said requested IP address usage data;

means for determining whether one or more of said plurality of local IP address

pools should be reallocated based upon at least said requested IP address

usage data;

means for reallocating one or more of said plurality of local IP address pools

based upon said determining;

means for updating one or more of said local IP address pool databases and a

global IP pool database based upon said reallocating, said global IP

address pool database including the information maintained in each said

local IP address pool;

wherein said local IP address pool includes a high watermark that indicates the

maximum number of IP addresses used by said network edge device;

wherein said means for determining further comprises means for ascertaining

whether said high watermark of a local address pool exceeds a high

watermark limit;

means for indicating one or more IP address pools should be reallocated to give

more IP addresses to the network element associated with said high

watermark when said high watermark exceeds said high watermark limit;

wherein each said local IP address pool further comprises a low watermark that

indicates the minimum number of IP addresses used by said network edge

device;

wherein said means for determining further comprises means for ascertaining

whether said low watermark of said address pool exceeds a low watermark

limit; and

means for indicating one or more IP address pools should be reallocated to

reclaim IP addresses from the network element associated with said low

watermark when said low watermark exceeds said low watermark limit.

110.   (Previously Presented) The apparatus of claim 109 wherein said means for

reallocating further comprises:

means for allocating an IP address from IP addresses reclaimed from other IP

address pools when said high watermark exceeds said high watermark

limit and when the number of unallocated IP addresses is insufficient;

means for allocating an IP addresses from unallocated IP addresses when said

high watermark exceeds said high watermark limit and when the number

of unallocated IP addresses is sufficient; and

means for reallocating one or more IP address pools to reclaim IP addresses from

a local IP address pool when said high watermark is less than said high

watermark limit and said low watermark is greater than said low

watermark limit.

111.   (Previously Presented) The apparatus of claim 109 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

said means for determining further comprises means for ascertaining whether said

low watermark of said address pool exceeds a low watermark limit; and

said apparatus further comprises means for indicating one or more IP address

pools should be reallocated to reclaim IP addresses from the network

element associated with said low watermark when said low watermark

exceeds said low watermark limit.

112.   (Previously Presented) The apparatus of claim 109 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

113.   (Previously Presented) The apparatus of claim 109 wherein said network operates according to a simple network management protocol (SNMP).

114.   (Previously Presented) The apparatus of claim 113 wherein

said low watermark is stored in an expression MIB; and

·said high watermark is stored in an expression MIB.

115.   (Previously Presented) An apparatus capable of managing Internet Protocol (IP) addresses on a data communications network, said apparatus comprising:

a memory for storing a global IP address pool; and

a global IP pool manager, comprising:

an allocator capable of allocating a plurality of local IP address pools, each of said

local IP address pools associated with a different network edge device

capable of accepting connection requests requiring an IP address;

a requestor capable of requesting IP address usage data from one or more of said

network edge devices;

a determiner capable of determining whether one or more of said plurality of local

IP address pools should be reallocated based upon at least said requested

IP address usage data;

a reallocator capable of reallocating one or more of said plurality of local IP

address pools based upon said an indication from said determiner;

an updater capable of updating one or more of said local IP address pool

databases and said global IP pool database based upon said reallocating;

wherein said local IP address pool includes a high watermark that indicates the

maximum number of IP addresses used by said network edge device;

wherein said determiner is further configured to ascertain whether said high

watermark of a local address pool exceeds a high watermark limit and to

indicate IP address pool should be reallocated to give more IP addresses to

the network element associated with said high watermark when said high

watermark exceeds said high watermark limit;

wherein each said local IP address pool further comprises a low watermark that

indicates the minimum number of IP addresses used by said network edge

device;

wherein said determiner is further configured to ascertain whether said low

watermark of said address pool exceeds a low watermark limit and to

indicate one or more IP address pools should be reallocated to reclaim IP

addresses from the network element associated with said low watermark

when said low watermark exceeds said low watermark limit.

116.   (Previously Presented) The apparatus of claim 115 wherein said reallocator is

further configured to:

allocate an IP address from IP addresses reclaimed from other IP address pools

when said high watermark exceeds said high watermark limit and when

the number of unallocated IP addresses is insufficient;

allocate an IP addresses from unallocated IP addresses when said high watermark

exceeds said high watermark limit and when the number of unallocated IP

addresses is sufficient; and

reallocate one or more IP address pools to reclaim IP addresses from a local IP

address pool when said high watermark is less than said high watermark

limit and said low watermark is greater than said low watermark limit.

117. (Previously Presented) The apparatus of claim 115 wherein

each said local IP address pool further comprises a low watermark that indicates

the minimum number of IP addresses used by said network edge device;

and

said determiner is further configured to ascertain whether said low watermark of

said address pool exceeds a low watermark limit and to indicate one or

more IP address pools should be reallocated to reclaim IP addresses from

the network element associated with said low watermark when said low

watermark exceeds said low watermark limit.

118. (Previously Presented) The apparatus of claim 115 wherein

said low watermark is expressed as a percentage of allocated IP addresses; and

said high watermark is expressed as a percentage of allocated IP addresses.

119. (Previously Presented) The apparatus of claim 115 wherein said network operates

according to a simple network management protocol (SNMP).

120.   (Previously Presented) The apparatus of claim 119 wherein

said low watermark is stored in an expression MIB; and

said high watermark is stored in an expression MIB.